

Serial No. 10/681,246

Amendment Dated: January 10, 2006

Reply to Office Action Mailed: August 10, 2005

Attorney Docket No.: 056208.52825US

**REMARKS**

Applicants acknowledge the indication of the allowability of the subject matter of claims 6 and 18, as set forth at page 5 of the Office Action. In particular, the latter claims would be allowable if rewritten in independent form. By the foregoing amendment, Claim 6 has been rewritten as new Claim 22, while Claim 18 has been rewritten in independent form. Applicants respectfully submit that Claims 18 and 22 are allowable.

Claims 1-5 and 7-17 have been rejected under 35 USC §102(b) or (e) as anticipated by either Schmidt et al. (U.S. Patent No. 6,600,103) or Uematsu et al. (U.S. Patent No. 6,130,640). However, for the reasons set forth hereinafter, Applicants respectfully submit that all claims which remain of record in this application distinguish over both Schmidt et al. and Uematsu et al., whether considered separately, or in combination with other references. In particular, Claims 1-5 and 7-17 have been canceled, and rewritten as new Claims 19-35.

In order to advance the prosecution of this application, Applicants note that the derivation of the substantive content of Claims 19-35 as follows:

new Claim 19 (independent)	former Claim 1, former Claim 4
new claims 20, 21	former claims 2, 3

new Claim 22	former Claim 6
new Claim 23	former Claim 8
new Claim 24	former Claim 10
new Claim 25 (independent)	former Claim 5, former Claim 11
new Claims 26-29	former Claims 7-10
new claims 30-33	former claims 12-15
new Claim 34 (independent)	former Claim 16
new Claim 35	former Claim 17

The present invention is directed to a vehicle-mounted millimeter wave radar module, and a method of manufacturing such a module. In particular, in the vehicle-mounted radar according to the present invention, an electronic circuit (such as MMICs 10, 11) is mounted on a substrate 1, and is contained in a cover (cap 50) joined to the substrate. In such a radar module, it is desirable to protect the electronic circuits from moisture in the air. However, thermal processing and thermal air-expansion in manufacturing such a module may lead to a perforation (that is, a blow hole) or a crack in a joint between the cover and the substrate. As a result, it is extremely difficult to seal the inside of the cover completely with a joint adhesive. If this problem is not resolved, the inside cover (cap) is vulnerable to intrusion by moisture.

Although the present invention utilizes a moisture resistant resin to resolve this problem, the moisture resistant resin itself cannot be disposed directly on the high frequency circuit substrate, because the resin causes large electrical losses, as described in the remarks submitted on May 23, 2005. Accordingly, in the millimeter wave radar module according to the present invention, a case (40) is combined with a substrate to form a recess which contains the joint (60) between the cover and the substrate. A moisture resistant resin is filled into the recess, around the cap (50), as well as the joint between the cap and the substrate. With such a structure, even if a perforation occurs within the joint, the electronic circuit is protected from moisture in the air, because it is completely surrounded by the moisture resistant resin.

The latter features of the invention are recited in independent Claim 19, 25 and 34 of the present application. In particular, claim 19, for example, provides "a case that is combined with said substrate to form a recess for containing a joint between said cover and said substrate" and, furthermore, that "a moisture resistant resin ...is filled around said joint between said cover and said substrate in said recess." Claim 25 contains a similar limitation. Claim 34, on the other hand, provides steps of "forming an enclosure about said MMIC by joining a cap to said substrate in such a manner as to position said MMIC in said enclosure" as well as "providing a recess containing a joint between said cap and

said substrate by attaching a case to said substrate" and, finally "filling said recess with a moisture resistant resin."

In contrast to the foregoing, the Schmidt et al. reference discloses that a housing for an electronic component in a microwave device is comprised of three tightly connected parts (2, 8, 11). Uematsu et al., on the other hand, discloses, in Figure 10, a high frequency, integrated circuit (MMIC) 203 which is mounted on one surface of a metal substrate 202. A low frequency, integrated circuit 204, etc., is mounted on the opposite surface of the metal substrate. Neither of these references, however, discloses the structure of the present invention including, in particular, that a case is combined with a substrate to form a recess that surrounds a joint between the cover and the substrate, with a moisture resistant gel being filled into the recess around the joint in the hollow. Accordingly, Applicants respectfully submit that new independent Claim s19, 25 and 34, and accordingly all claims of record, distinguish over the cited references.

In light of the foregoing remarks, this application should be in condition for allowance, and early passage of this case to issue is respectfully requested. If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

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If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #056208.52825US).

Respectfully submitted,

  
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